

## Ch 10 Review

## 10.1 Exponential Functions

- graphs  $y = a \cdot b^x$   $(0, a)$
- write equations  $y = a \cdot b^x$
- change base  $2^x = 8$

## 10.2 Logarithmic and Exponential forms

- switching between the forms
- inverse properties

$$\log_5 5^3 \quad 5^{\log_5 2}$$

(3)                      2

## 10.5 e &amp; ln

- Compound continuously

$$A = Pe^{rt}$$

## 10.6 Growth and Decay

- word

$$y = a(1 \pm r)^t$$

$$y = ae^{kt}$$

Interest                      Appr./Depr.  
Growth/Decay

## 10.3 Properties of Logs

- +  $x$   $\log 50 = \log 5 + \log 10$
- $\div$  -
- power rule  $\log_8 7 = \frac{\log 7}{\log 8}$

## 10.4 Common Logs

- change of base formula
- word problems, pH,  $I_0$ , richter

## Review problems

p571

#s 1-8, 11, 12, 13-27 odd, 28, 29

p570

#s 63-65

p568

#s 24-27

Choose the term that best completes each sentence.

- The equation  $y = 0.3(4)^x$  is an exponential (growth, decay) function.
- The logarithm of a quotient is the (sum, difference) of the logarithms of the numerator and the denominator.
- The base of a natural logarithm is (10, e).

## Skills and Applications

- Write  $3^7 = 2187$  in logarithmic form.
- Write  $\log_8 16 = \frac{4}{3}$  in exponential form.
- Write an exponential function whose graph passes through (0, 0.4) and (2, 6.4).
- Express  $\log_5 5$  in terms of common logarithms.
- Evaluate  $\log_2 \frac{1}{32}$ .

Simplify each expression.

11.  $(3\sqrt{8})\sqrt{2}$

12.  $81\sqrt{5} \div 3\sqrt{5}$

Solve each equation or inequality. Round to four decimal places if necessary. odds

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|---|--|---------------------------------------|
| 13. $2^{x-3} = \frac{1}{16}$                      | 14. $27^p + 1 = 3^{4p-1}$                | 15. $\log_2 x < 7$                    |
| 16. $\log_m 144 = -2$                             | 17. $\log_3 x - 2 \log_3 2 = 3 \log_3 3$ | 18. $\log_9 (x+4) + \log_9 (x-4) = 1$ |
| 19. $\log_5 (8y-7) = \log_5 (y^2+5)$              | 20. $\log_3 3^{(4x-1)} = 15$             | 21. $7.6^{x-1} = 431$                 |
| 22. $\log_2 5 + \frac{1}{3} \log_2 27 = \log_2 x$ | 23. $3^x = 5x-1$                         | 24. $4^{2x-3} = 9x+3$                 |
| 25. $e^{3y} > 6$                                  | 26. $2e^{3x} + 5 = 11$                   | 27. $\ln 3x - \ln 15 = 2$             |

COINS For Exercises 28 and 29, use the following information.

You buy a commemorative coin for \$25. The value of the coin increases 3.25% per year.

28. How much will the coin be worth in 15 years?

29. After how many years will the coin have doubled in value?

63. BIOLOGY For a certain strain of bacteria,  $k$  is 0.872 when  $t$  is measured in days. How long will it take 9 bacteria to increase to 738 bacteria?64. CHEMISTRY Radium-226 decomposes radioactively. Its half-life, the time it takes for half of the sample to decompose, is 1800 years. Find the constant  $k$  in the decay formula for this compound.

65. POPULATION The population of a city 10 years ago was 45,600. Since then, the population has increased at a steady rate each year. If the population is currently 64,800, find the annual rate of growth for this city.

Evaluate each expression. See Examples 3 and 4 on pages 532 and 533.

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|--------------------|---------------------|-------------------|---------------------|
| 24. $4^{\log_4 9}$ | 25. $\log_7 7^{-5}$ | 26. $\log_{81} 3$ | 27. $\log_{13} 169$ |
|--------------------|---------------------|-------------------|---------------------|